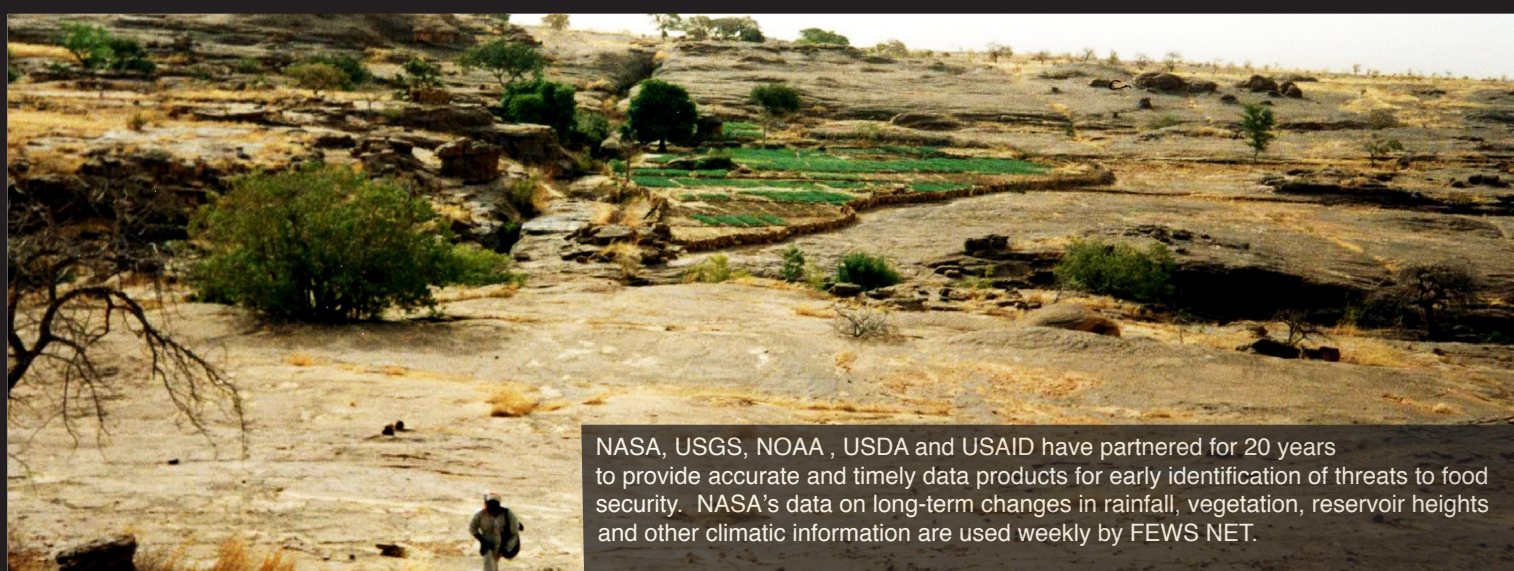




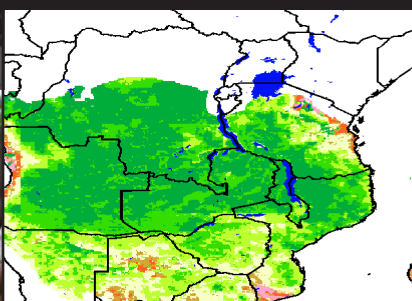
NASA and the Famine Early Warning Systems:

Using NASA Data to Monitor Food Security

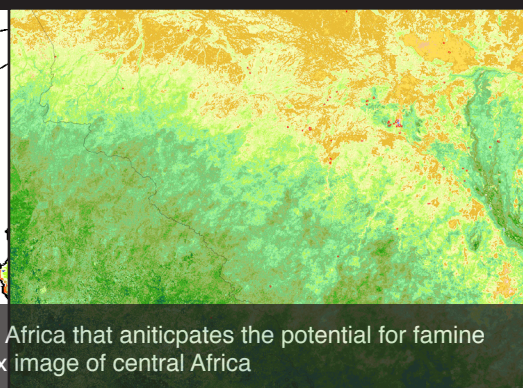


NASA, USGS, NOAA, USDA and USAID have partnered for 20 years to provide accurate and timely data products for early identification of threats to food security. NASA's data on long-term changes in rainfall, vegetation, reservoir heights and other climatic information are used weekly by FEWS NET.

Food and healthcare are provided during emergencies.



Center: Crop model data for southern Africa that anticipates the potential for famine



Right: NASA MODIS vegetative index image of central Africa

Goals

Provide comprehensive satellite-derived remote sensing information about current weather and climate in near real-time

Statistical projections of vegetation, rainfall and humidity one to three months into the future

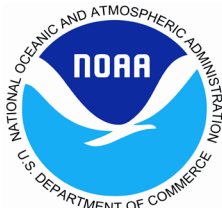
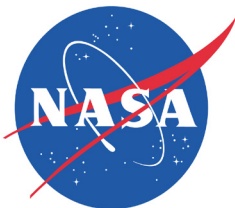
Integrated information about economic and climate variations which impact the ability of populations to access food

Outcomes

Enhanced early warning of reductions in food availability

Focused and more accurate estimation of regions of sustained and severe food production deficits

Reduced expense and loss of life through earlier and more accurate decision making



Enhancing USAID Famine Early Warning Systems with NASA Earth Science Results

Summary

Famine is defined as being the widespread shortage of food, a phenomenon that is usually accompanied by regional malnutrition, starvation, epidemic disease, and increased mortality. An estimated 70 million people died from famine, around the world, in the twentieth century. The U.S. Agency for International Development (USAID) provides humanitarian assistance to vulnerable populations facing slow-onset disasters, due to drought or conflict, including famine. The NASA Applied Sciences Program is funding ways to scientifically support organizations like USAID in their effort to better predict and prepare for famine. To enhance USAID humanitarian programs, NASA Earth observations and modeling results are being integrated into the Famine Early Warning Systems Network (FEWS NET).

Presently, NASA MODIS (onboard the Terra and Aqua satellites) Normalized Difference Vegetation Index (NDVI), NOAA Advanced Very High Resolution Radiometer NDVI, as well as precipitation and humidity measurements, are being used to calculate standardized NDVI, precipitation, relative humidity, and total precipitable water indices. These data will be used to make statistical estimates of vegetation and rainfall one to four months in advance, essentially modeling the potential for crops, in order to more accurately predict the likelihood for famine.

High-resolution projections of rainfall and vegetation information will be integrated, via a state of the art visualization system, into the current climate monitoring system. These statistical climate projections will substantially improve the ability of public health officials to detect and quantify reductions in food production due to drought and flooding.

Project Details

The project will provide real-time and projected rainfall, temperature, vegetation and humidity data for FEWS NET. This work involves obtaining historical data for rainfall, precipitable water and vegetation using NASA datasets. The standardization of precipitation, humidity and NDVI and the creation of uncertainty probabilities for these products will expand the ability of FEWS NET to identify and properly diagnose negative and positive anomalies in growing conditions in Africa.

The data will be placed into models and projections of rainfall, humidity and the vegetation index will be conducted. The matched filter regression technique will be used to project rainfall and relative humidity fields up to three months in advance. Projected rainfall and humidity fields will then be used to produce projected vegetation index data on a regional basis.

Data cubes, including past, present and future rainfall, temperature, precipitable water and vegetation data will be presented in a new format for improved understanding and diagnosis of growing conditions. Using web-based data analysis and mapping tools this project will develop a new Web site serving FEWS NET and its partners. By coordinating development with user requirements, the ability of data users to identify and track anomalies in growing conditions will be greatly enhanced. The integration of NASA data into the USAID FEWS NET programs will significantly strengthen USAID's decision support systems that identify impending food crises.

For more information about this project

John Haynes
jhaynes@nasa.gov
202- 358-4665

James P Verdin
verdin@usgs.gov
303-497-6930

Molly Brown
molly.e.brown@nasa.gov
301.614.6616

NASA APPLIED SCIENCES PROGRAM & PUBLIC HEALTH

This application area focuses on the use of NASA assets to support planning and decision making for the public health, medical, and environmental health sectors. The application includes epidemiologic surveillance of infectious disease, environmental health, and emergency response and preparedness.

Public Health also explores issues of toxic and pathogenic exposure, natural and man-made hazards for risk characterization and mitigation, and improvements to health and safety.

Key Web sites

USAID FEWSnet
<http://www.fews.net>

Applied Sciences Public Health
<http://nasascience.nasa.gov/earth-science/applied-sciences/national-applications/public-health>

NOAA Climate Prediction Center
<http://www.cpc.noaa.gov/products/fews/>

USGS Early Warning Website:
<http://earlywarning.usgs.gov>